Upper limb deep vein thrombosis due to Langer's axillary arch

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Langer's axillary arch is a recognized muscular anomaly characterized by an accessory muscular band crossing the axilla that rarely causes symptoms. We describe a patient who presented with an upper limb deep vein thrombosis caused by this aberrant muscle, which we believe is the first reported case. Axillary surgery with division of the aberrant muscle relieved upper limb venous obstruction in this patient. (J Vasc Surg 2012;55:234-6.)

Langer's axillary arch is an accessory muscular band most commonly arising from latissimus dorsi and inserting into pectoralis major.[1] This common anatomic variant has a reported incidence of up to 8% and is often seen during routine axillary surgery for nodal sampling.[2,3] It is rarely associated with symptoms, and unlike thoracic outlet syndrome, is not normally considered in the differential diagnosis of upper limb deep vein thrombosis (DVT). We present what we believe is the first patient with upper limb DVT caused by Langer's axillary arch successfully treated by surgical division of the aberrant muscle band.

CASE REPORT

A 58-year-old woman presented acutely to the vascular team with an upper limb DVT confirmed on compression with a duplex ultrasound scan. She had presented with an unprovoked DVT in the right leg 4 years previously, which was treated for 3 months with oral anticoagulant therapy. The patient's thrombophilia screen, conducted by a hematologist, was negative for any congenital or acquired thrombophilia. The result of a full oncologic screen was also negative.

On admission, an ascending venogram confirmed thrombotic occlusion of the left subclavian vein and proximal axillary vein. Thoracic outlet syndrome was excluded with a thoracic outlet radiograph and magnetic resonance imaging (MRI). After informed consent, the patient declined acute catheter-directed venous thrombolytic therapy. She was treated with subcutaneous low-molecular-weight heparin and then oral anticoagulant therapy with coumarin, on hematology advice. Apart from left upper limb swelling, she had no complications and was discharged with planned outpatient review.

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At outpatient review, she continued to complain of left upper limb swelling and venous congestive symptoms, which resolved on limb elevation, and was referred to vascular surgery. Compression duplex ultrasound scanning was repeated at 6 months and showed satisfactory resolution of the left upper limb DVT with recanalization of the subclavian and axillary veins. An MR venogram did not report any abnormality, and a review of her MRI showed no evidence of thoracic outlet syndrome compression of the neurovascular bundle at the thoracic outlet. However, the patient continued to experience left arm swelling and venous congestive symptoms. The venous phase of a repeat MRI of the left hemithorax and upper limb suggested a stenosis at the junction of the left subclavian and axillary veins in the axilla (Fig 1).

After multidisciplinary team discussion, we proceeded to ascending venogram, which confirmed the axillary venous stenosis (Fig 2). At the same procedure, an attempted percutaneous venous angioplasty achieved a good immediate radiologic result; however, rapid recoil and restenosis were noted on deflation of the angioplasty balloon, suggesting extrinsic venous compression. This prompted the team to carefully review the preprocedural MRIs of the left axilla, and on this retrospective review, an aberrant fibromuscular band was noted to cause extrinsic compression of the axillary vein consistent with Langer's axillary arch compression syndrome.

After further multidisciplinary team review, and informed consent, a combined vascular surgery and breast surgery team explored the patient's left axilla. The left axillary vein was being extrinsically compressed by anomalous fibromuscular tissue. This compression was relieved after division of the Langer's axillary arch, allowing normal axillary venous return (Figs 3 and 4). The patient made a full recovery without complications. The congestive symptoms in her arm had completely resolved at the outpatient follow-up visit, and she has since been able to discontinue oral anticoagulant therapy after hematologic advice.

DISCUSSION

Langer's axillary arch, originally described by Ramsay in 1795 and confirmed by Langer in 1894, is an accessory muscle typically crossing the axilla from latissimus dorsi inserting into pectoralis major.[1,2] There are, however, many variations of origin, course, size and insertion (Fig 5).

It has a reported frequency of 7% to 8% within the general population; however, this figure is predominantly

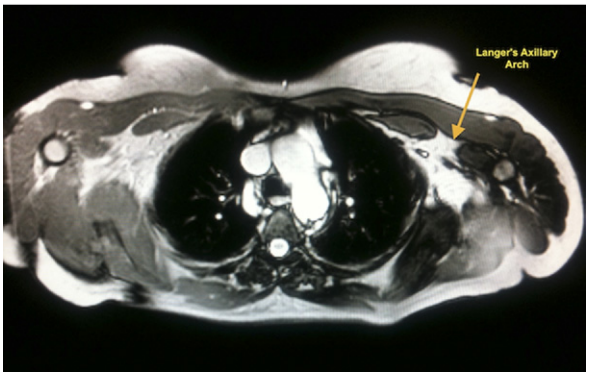

Fig 1. Magnetic resonance image demonstrates the Langer's axillary arch (LAA).

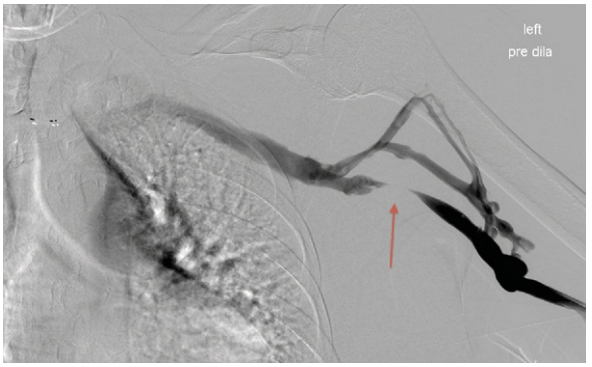

Fig 2. Upper limb venogram confirms venous stenosis.

based on cadaveric dissections, and the reported incidence during surgery ranges from 0.25% to 6.5%. Langer's axillary arch has been described in various anatomic studies on cadaveric specimens. Other authors have described the clinical sequelae resulting from this anomalous muscle; however, few have described a symptomatic patient with the correct diagnosis detected by imaging and subsequent surgical treatment.[3-7]

This anatomic variant is not well described within the field of vascular surgery and its clinical implications are infrequently documented. Unlike thoracic outlet syndrome (or Paget-Schroetter syndrome), Langer's axillary arch is not normally considered as a potential cause in the differential diagnosis of unprovoked upper limb DVT. We report a unilateral Langer's axillary arch, seen as a single band, in a patient who had initially presented with an upper limb DVT and, subsequently, congestion. Sachatello[7] in 1977 and Hafner[6] in 2010 both reported patients with intermittent obstruction of the axillary vein without venous thrombosis. Many other symptomatic patients, given the common incidence of this muscular anomaly and even of provoked DVT, may have remained undiagnosed due to a low index of clinical suspicion for this condition.

Owing to the lower incidence of arm DVT, noninvasive methods of imaging are perhaps not as refined as those used

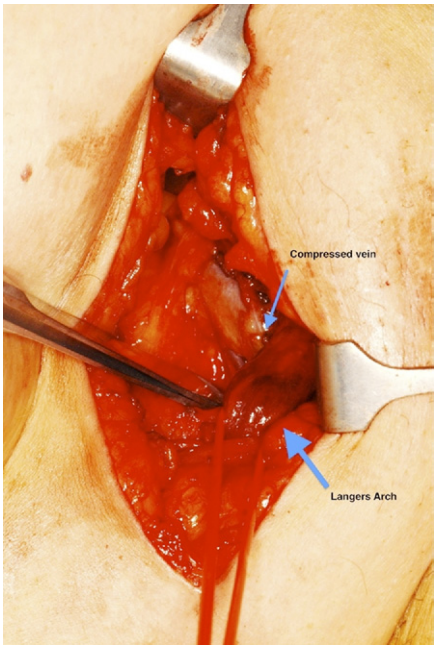

Fig 3. Intraoperative image demonstrates the Langer's axillary arch (LAA).

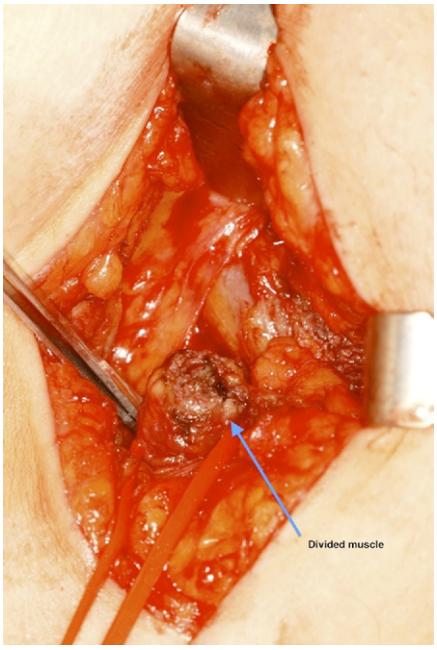

Fig 4. Divided Langer's axillary arch (LAA).

to investigate the leg.[8] This case highlights the diagnostic challenge that exists with the clinical suspicion and correct preoperative investigation of suspected Langer's axillary arch. In the literature, minimal cases have been reported of preoperative diagnosis through imaging. Suzuma et al[9] reported a case during routine investigation for breast

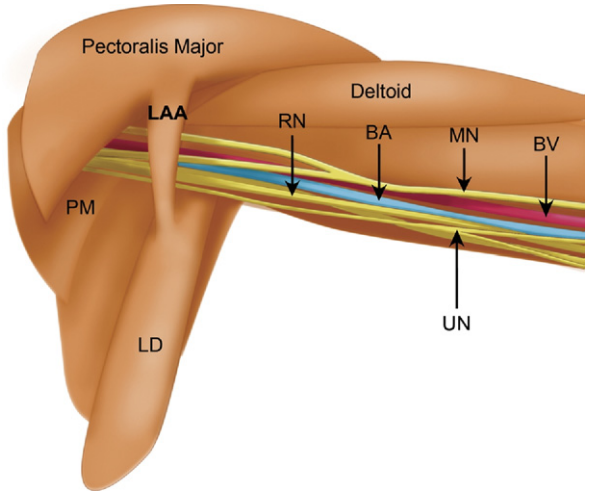

Fig 5. Diagram shows relationship of the anatomy with the Langer's axillary arch (*LAA*). *BA*, Brachial artery; *BV*, basilic vein; *LD*, latissimus dorsalis; *MN*, median nerve; *PM*, pectoralis major; *RN*, radial nerve; *UN*, ulnar nerve.

cancer, where MR axillography was superior to computed tomography (CT) by providing high-quality contrast between high-intensity fat and low-intensity muscles, lymph nodes, and vessels. Hafner et al[6] detected the aberrant muscle by using helical three-dimensional CT. Our patient was diagnosed through a combination of CT angiogram, MR venogram, and MRI. Although no abnormalities were seen on the initial imaging, the patient's symptoms persisted, thus highlighting the importance of repeat imaging in an unresolved case.

Alternative presentations of Langer's axillary arch, when symptomatic, include axillary mass, neurovascular thoracic outlet syndrome, and shoulder instability.[1] Langer's axillary arch appears to have the largest clinical influence within the field of breast surgery, where it is frequently noted as a muscular anomaly during axillary dissection for nodal sampling or clearance. If identified incidentally at the time of surgery within the axilla, excision is recommended not only to prevent any future pathology but also to aid adequate axillary exposure and ensure a safe technique when performing any form of axillary surgery. In our patient, who presented with symptoms of extrinsic venous compression, simple surgical division of the arch was curative. However, there may be potential for injury to the axillary vein wall due to the extrinsic compression, which may later cause fibrosis and restenosis.

CONCLUSIONS

Langer's axillary arch is a common muscle variant in the axilla, which is usually asymptomatic. However, it can present with upper limb deep vein thrombosis or venous congestive symptoms and should be considered as a differential diagnosis in the setting of unprovoked upper limb deep vein thrombosis in a young adult. Correct identification of the relevant anatomy and subsequent simple surgical division is curative.

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